Computer Mediated Communication (CMC)

Lecture 10: Culture and CMC
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Research Interest: Interpersonal Communication, CMC, intercultural collaboration
Computer Mediated Communication (CMC)

Lecture 11: Culture and CMC
Why culture in CMC research?

Most CMC studies: participants from Western cultures (e.g., U.S. or Europe)

Do results generalize to Eastern cultures?

Do results generalize to cross-cultural interaction?

Why is this important?
Cultural Dimensions

Low vs. high context (e.g., Hall)

Task vs. relationship focus (e.g., Triandis)

Individualism vs. collectivism (e.g., Markus)

Hollistic vs. Analytical (e.g., Nisbett)
Culture and CMC

Cultural differences in
- conversational grounding
- interactional goals
- collaboration styles/interaction norms
- richness of media
- appropriateness of different media for different tasks

So why study culture in CMC?
- Building theories of CMC
- Designing tools for global distribution and/or intercultural communication
Research about Culture & CMC

Conversational grounding, message content
Politeness
Negotiation strategies
Task performance
Setlock et al. Lab Studies

Series of experiments comparing communication and task outcomes on a negotiation task

Different CMC tools (IM, audio, video, FtF)

Two cultural groups:

- American (US, Canada): Low context, task-oriented, individualistic
- Chinese (PRC): High context, relationship-oriented, collectivistic
Paradigm

Arctic and desert survival tasks

- Rank items individually before discussion
- Discuss items and create joint ranking
- Rank items individually after discussion

Repeated measures design; tasks and media counterbalanced

Dependent measures:
- Conversational efficiency
- Persuasion
- Subjective ratings of partner, collaboration
Desert Survival Task

It is approximately 10 a.m. in mid-August… you and your group are flying over the Sonora Desert … the … area is quite flat and…barren. The last weather report indicated the temperature would reach 110 degrees… [You are] approximately 70 miles from a mining camp… the nearest known habitation…. The plane crash lands in the Desert, burning up and leaving only the air frame… your group was able to salvage 6 items:

• Book, Edible Plants of the Desert
• Rearview mirror
• Flashlight (four battery size)
• 1 jacket per person
• Loaded .38 caliber pistol
• One 2-quart plastic canteen per person, full of water
**Study 1: FtF vs. IM**  
*(Setlock et al., CSCW 2004)*

<table>
<thead>
<tr>
<th>Medium</th>
<th>Type of Information</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Verbal Content</td>
<td>Tone of Voice</td>
<td>Visual Cues</td>
<td></td>
</tr>
<tr>
<td>Instant Messaging</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Audio Conferencing</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Video Conferencing</td>
<td>Yes</td>
<td>Yes</td>
<td>Partial</td>
<td></td>
</tr>
<tr>
<td>Face-to-Face</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis: High-context cultures will find it easier to communicate in richer media whereas for low-context cultures there will be no media effect.
Study 1: Speaking Turns/Task

Thoughts?
Study 1: Speaking Turns/Task

Main effect of medium: people talk less in IM ($p < .005$)
Main effect of culture group: AA < AC < CC ($p < .001$)
Significant interaction between culture and medium ($p = .01$)
Study 1: Persuasion

Deviation score: difference between partners’ rankings across all items

What do you notice here?
No differences in pre-negotiation rankings
CC pairs come to greater agreement ($p < .05$)
No effect of media and no interaction
Qualitative Analysis

CC pairs talk longer about the task and reach greater agreement
  • Cultural differences in approach to the task?

Qualitative analysis of a random subset of conversations from each condition
  • Two basic cultural differences
P1: why did you put the mirror as 4?
P2: you could use it to signal for help or something like that
P1: that's true...okay maybe make it 5 then?

P1: what's the use of mirror?
P2: so jacket is not last, or mirror is?
P2: mirror is for asking help mainly, I guess
P1: how about using pistol to ask for help?
P1: mirror can be last if we have pistol in front of it.
P2: yes, so either mirror or jacket is the least important
P1: shoot the sky is better than a mirror.
P1: right.
P2: ok, mirror
P1: I guess jacket is more important than mirror.

Can you guess which pair is A, which is C?
What do you notice?
Depth of Analysis

American Pair
P1: why did you put the mirror as 4?
P2: you could use it to signal for help or something like that
P1: that's true...okay maybe make it 5 then?

Chinese Pair
P1: what's the use of mirror?
P2: so jacket is not last, or mirror is?
P2: mirror is for asking help mainly, I guess
P1: how about using pistol to ask for help?
P1: mirror can be last if we have pistol in front of it.
P2: yes, so either mirror or jacket is the least important
P1: shoot the sky is better than a mirror.
P1: right.
P2: ok, mirror
P1: I guess jacket is more important than mirror.

Chinese pairs discussed items more thoroughly
Relationship-Building

Chinese pairs put more effort into relationship-building in addition to solving the task

- Meta-statements about negotiation status
- Supportive statements

P2: So the first two things are water and pistol
P1: maybe 😊
P1: totally agree
P2: OK, we have made the first choice! Congratulations!
P2: Then we need to think more
Setlock et al. found effect of medium (IM vs. FtF) on Chinese pairs but not American pairs.

The pairs were talking in English, even the Chinese.

What will happen if the Chinese participants speak their native language?
Study 2: Chinese Language

Study 1: effect of medium (IM vs. FtF) on Chinese pairs but not American pairs
Could this be because Chinese pairs were speaking/typing in a second language?
Study 2: Method

Materials & instructions translated into Chinese
Experiment run entirely in Chinese
IM (MSN) and face-to-face conditions

<table>
<thead>
<tr>
<th>物品</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>一加仑装罐的枫蜜糖浆</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>一个20寸 x 20 寸 耐 受 力 强的帆布</td>
<td></td>
<td>1</td>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13根火柴（装在铁制转头，防水的容器里）</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>一个小型的镜子和刮胡须刀</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>手斧</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>一个两盎斯的塑胶罐加上水溶纯化药片</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1'是最重要的，而6'是最不重要的。
Results replicate study 1
Effects of media **NOT** appear to be due to speaking in a foreign language
CMC Retrospective study
Nguyen & Fussell, CSCW 2012

How people from different cultures adopt different strategies regarding message production

- Task-related messages
- Relational messages
- Back-channel responses

How cultural differences in comm styles may lead to comm issues

- Lack of understanding
- Lack of involvement
- Negative emotions
Method

**Phase 1:**
Same-culture & cross-culture pairs of American and Chinese
Talk about a crime case in IM (Gtalk)
Gtalk window screen recorded

**Phase 2:**
Review own IM conversation after, give feedback every 2 min
- Ratings on level of understanding, involvement, tension, annoyance
- Indicate problem, if existing, & comment
Results: Message content

Number of task-related facts

Thoughts?

- American Participant

- Chinese Participant

Natural log of the number of facts uttered every 1 minute
Results: Message content

Number of task-related opinions

Thoughts?

American Participant

Chinese Participant

Natural log of the number of task-related opinions uttered every 1 minute

American partner

Chinese partner
Group brainstorming can lead to better idea generation via idea exchange (Paulus & Brown, 2007) But group context can introduce social pressure (Diehl & Strobe, 1987), fear of stating ideas because of peer pressure

**Cultural hypothesis:** Collectivists are more sensitive to social pressure in brainstorming
- Less participation, fewer ideas presented and less interactive discussions
Group Cultural Composition

Same-Culture Triads (AAA, CCC)

Mixed-Culture Triads (AAC, ACC)

Text-only chatroom

Video-added chatroom
Idea Generation Tasks

What are the practical benefits or difficulties when people start having an extra thumb (or extra eye) after the year 2020?
Social Interaction

Responding to others’ ideas is not required in brainstorming
  • Responding could be hard under social pressure

Responsiveness measurement
  • Percentage of responding for testing how culture differ
## Two Conversational Styles

### High Responsiveness

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>With the extra eye, can do hw for two different classes at the same time</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Yeah, but you also need 4 hands</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Haha, that would be sweet!</td>
</tr>
</tbody>
</table>

### Low Responsiveness

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Benefit: cars no longer need rear view mirror</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Less chance to be followed by bad guys</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Difficulty: cut hairs around the extra eye</td>
</tr>
</tbody>
</table>
## Conversation Coding

<table>
<thead>
<tr>
<th>Category</th>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideation</td>
<td>Active</td>
<td>Ideas offered for the first time in the brainstorming session</td>
</tr>
<tr>
<td>Meta-strategy</td>
<td>Active</td>
<td>Strategizing, orienting and coordinating brainstorming</td>
</tr>
<tr>
<td>Response</td>
<td>Reactive</td>
<td>Question, elaboration and opinion evoked by previous contributions</td>
</tr>
<tr>
<td>(Dis-)Agreement</td>
<td>Reactive</td>
<td>Acknowledgement and explicit consent/dissent</td>
</tr>
<tr>
<td>Explanation</td>
<td>Reactive</td>
<td>Explaining ideas</td>
</tr>
</tbody>
</table>
Responsiveness By Culture

What do you make of this pattern?
Responsiveness By Culture

Americans had similar responsiveness when working with Americans/Chinese.
Chinese increased responsiveness to match that of Americans.
Suggests Chinese have greater awareness of cultural cues:
- Richer cues -> stronger adaptation.
Effects on Task Performance

**Performance measure:** Unique ideas contributed the first time to a session

- Cultural main effect: Americans presented more unique ideas
Improving Cross-Cultural CMC

Anecdotal and empirical evidence suggests that cross-cultural communication is problematic

- Misinterpretations, negative outcomes

Wang et al’s study suggests that some cultures may be more open than others to accommodating to intercultural partners

Can HCI design improve cross-cultural CMC?
Types of Interventions

*Sender-oriented*: highlight potentially problematic communication before messages are sent

*Recipient-oriented*: provide explanation for potentially problematic messages

*Automatic*: transform messages in real time to make them more appropriate for the recipient’s culture
Machine Translation  
(Yamashita et al., CSCW 2006)

How can we best support communication between people from multiple cultures?

Common language approach
- All speak the same language (typically English)
- But fluency is an issue

Machine translation approach
- All speak their native language
- But is conversational grounding an issue?
Modified Tangram Task
8 pairs of participants, one member Japanese, the other member either Korean or Chinese
None bilingual in an Asian language; all bilingual in English
All pairs use AnnoChat system
Procedure: 2 trials in English followed by 2 trials using native language
### Table 1 Utterance Types

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation</td>
<td>A speaker describing a figure: e.g., “Figure 7 looks like a bird flying to the left.” “Its neck is long.”</td>
</tr>
<tr>
<td>(Description)</td>
<td></td>
</tr>
<tr>
<td>Presentation</td>
<td>A speaker explaining a figure with a noun phrase: e.g., “Figure 5 is a dancing lady.”</td>
</tr>
<tr>
<td>(Noun phrase)</td>
<td></td>
</tr>
<tr>
<td>Question Confirmation</td>
<td>An addressee asking the speaker for clarification, more information, or confirming an understanding: e.g., “Is she wearing a long dress?”</td>
</tr>
<tr>
<td>Acceptance</td>
<td>An addressee accepting the speaker’s presentation: e.g., “Ok,” “That’s my 5th figure.”</td>
</tr>
<tr>
<td>Not Understood</td>
<td>An addressee telling the speaker that he/she did not understand the message (e.g., “I don’t understand.”)</td>
</tr>
<tr>
<td>Others</td>
<td>Utterances that don’t belong to any of the above categories.</td>
</tr>
</tbody>
</table>
Participants are more likely to use NP vs. description on the second trial.

Effect is larger for English condition.

Participants in the MT condition often used exactly the same expression on the second trial.
### Machine Translation: Results
(Yamashita et al., CSCW 2006)

<table>
<thead>
<tr>
<th>Japanese Screen (translated in English)</th>
<th>Chinese Screen (translated in English)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;First Trial&gt;</strong></td>
<td><strong>&lt;First Trial&gt;</strong></td>
</tr>
<tr>
<td>J: My second figure looks like an animal.</td>
<td>J: My second figure is like an animal.</td>
</tr>
<tr>
<td>J: It has four feet and a tail.</td>
<td>J: It has four feet and a tail.</td>
</tr>
<tr>
<td>C: That’s my the 9th.</td>
<td>C: That’s my 9th.</td>
</tr>
<tr>
<td><strong>&lt;Second Trial&gt;</strong></td>
<td><strong>&lt;Second Trial&gt;</strong></td>
</tr>
<tr>
<td>J: My second figure is an animal with a tail and four feet.</td>
<td>J: My role of a young handsome beau is a boy with a tail and 4 feet.</td>
</tr>
<tr>
<td>C: What kind of meaning and rice boy?</td>
<td>C: What do you mean? A handsome boy?</td>
</tr>
<tr>
<td>J: My second figure looks like an animal.</td>
<td>J: My second figure is like an animal.</td>
</tr>
<tr>
<td>J: It has four feet and a tail.</td>
<td>J: It has four feet and a tail.</td>
</tr>
<tr>
<td>C: Oh, I understand, and am the 8th.</td>
<td>C: I got it. It’s my 8th figure.</td>
</tr>
</tbody>
</table>
What should we conclude from this study?
Will better MT solve the problem?
Or are there other issues in cross-cultural communication that technology could help address?
Another approach to MT
Gao, Wang & Fussell, CHI 2013

Natural English Sentence:
Instead of middle figure pointing, 6th finger at someone might be a new form of insulting.

Manual-translated Chinese Sentence:
第六只手指指人将会取代中指指人成为一种新的侮辱方式。

Machine-translated English Sentence (no highlighting):
Replace with the middle finger to point to others, the sixth finger pointing to the person may be a new kind of insulting way.

Machine-translated English Sentence (keyword highlighting):
Replace with the middle finger to point to others, the sixth figure pointing to the person may be a new kind of insulting way.

Machine-translated English Sentence (random highlighting):
Replace with the middle finger to point to others, the sixth figure pointing to the person may be a new kind of insulting way.
19:18:43 被試甲: Replace with the middle finger to point to others, the sixth finger pointing to the person may be a new kind of insulting way.
Did it work?

Keyword highlighted messages are clearer (p = .006)

Keyword highlights led to more positive impressions of partners (p = .02)
More Subtle Approaches

- Dual monitor workspaces
- Shared control of cursor
- Common view of work area

- Feedback updates every 1 min
- Relative display in % (self vs. partner)

Figure 1. The Meeting Mediator: Sociometric badges (right bottom) capture group dynamics which is displayed as real-time feedback on mobile phones (left top).
Questions

How might we design this system?
• Is agent same or other culture?
• Same agent for all cultures?

How should we implement the system?
• Need a “dictionary” of inappropriate words and phrases with culturally appropriate replacements
• Data on IM buddies cultures

Would the system be helpful?
• Tradeoffs between fluid conversation and agent’s assistance
• Benefits in person-perception and liking?
Future directions?

How should we deal with cultural differences in communication when designing CMC tools?

• Different tools for different cultures?
• Tool that provides maximum benefit across multiple cultures?
• Other ideas?